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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/711,067 | 08/20/2004 | Hsien-Che Teng | NAUP0621USA | 5066 |
| 27765 | 7590 | 07/05/2006 | EXAMINER | |
| NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116 | | | BARNES, SETH W | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2822 | |

DATE MAILED: 07/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/711,067

Applicant(s)

TENG ET AL.

Examiner

Seth Barnes

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– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seuter et al. US 6,951,804 B2 (Seutter).

Regarding **claims 1, 9, 11 and 17**, Seutter discloses in Fig. 4 and column 2, line 44 – column 8, line 44 a method of forming a material film, comprising: providing a chemical vapor deposition (CVD) chamber (100) comprising therein a showerhead (400) coupled to a gas source (130) and a pedestal (150) coupled to a heater (170), wherein said showerhead is further coupled to a radio frequency (RF) power source (410); positioning a substrate on said pedestal; heating said substrate by said heater (column 2, lines 44-50); flowing a tantalum-containing organic metal precursor gas (135, column 4, lines 60-66) into said CVD chamber through said showerhead with said RF power source being off (column 7, line 56-column 8, line 17), thereby depositing a material film (204, tantalum-nitride) on said heated substrate; thereafter turning on said RF power source to output a RF power; flowing an inert gas into said chamber; and in-situ plasma treating said material film within said CVD chamber by providing said RF power to said inert gas(column 8, lines 18-34); and.

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Seutter does not disclose removing said substrate out of said CVD chamber. However, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to remove the substrate out of the CVD chamber for the purpose of being able to complete further fabrication steps to the substrate or for using the substrate for its intended use.

Regarding **claims 2, 3, 12, and 13**, Seutter discloses in column 2, line 51-53 the method above wherein said substrate is heated to a temperature of 20°C to about 500°C.

Regarding **claims 4 and 14**, Seutter discloses in column 4, line 64 – column 5, line 9 the method above wherein said tantalum-containing organic metal precursor comprises pentakis(dimethylamido) tantalum (PDMAT) ($\text{Ta}(\text{N}(\text{Me})_2)_5$) and pentakis(diethylamido) tantalum (PDEAT) ($\text{Ta}(\text{N}(\text{Et})_2)_5$).

Regarding **claims 5, 6, 18, and 19**, Seutter discloses in column 8, line 1-8 the method above wherein said inert gas comprises argon (Ar) and the step of in-situ plasma treating said material film uses argon plasma.

Regarding **claims 7, 16, and 20**, Seutter does not disclose a RF power of 50~1000 Watts. However, the RF power of 0~1000 Watts is a processing parameter which would have been obvious to optimize. The power at which plasma is generated from is well known processing variable and the discovery of the optimum or workable plasma power range involves only routine skill in the art and is ascertainable by routine experimentation. Furthermore, the specification contains no disclosure of either the critical nature of the claimed RF power or any unexpected results arising therefrom. In

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any case, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed range of powers because Applicant has not disclosed that these RF powers are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using other powers. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical.

Regarding **claims 8 and 21**, Seutter discloses in Fig. 4 the method above wherein said CVD chamber is further coupled to a vacuum pump (**102**).

Regarding **claims 10**, Seutter discloses in Fig. 3a the method above wherein said material film is tantalum layer (**305**).

Regarding **claims 15**, Seutter discloses in Fig. 4 the method above wherein said pedestal is further coupled to a second RF power source (**412**).

Regarding **claim 22 and 23**, Seutter discloses in column 6, lines 7-28 the method of above wherein prior to the step of flowing said tantalum-containing organic metal precursor gas into said CVD chamber said method further comprising: flowing a nitrogen-containing gas (**136**, ammonia gas) into said CVD chamber shutting down said flow of said nitrogen-containing gas; and purging said CVD chamber with inert gas.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seth Barnes whose telephone number is (571) 272-6008. The examiner can normally be reached on Monday thru Thursday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SWB

A handwritten signature in black ink, appearing to be 'SWB' with a date '6/27/06' written below it.A handwritten signature in black ink, appearing to be 'Mary Wilczewski'.

Mary Wilczewski
Primary Examiner